CLAIMS

1. A gas port assembly for supplying or removing one or more gases to a powered electrode in a plasma processing chamber, the chamber having at least one electrode to which an alternating electrical potential is applied in use, the assembly being electrically insulated from the electrode(s), the assembly comprising, a number of dielectric members and a number of electrically conductive members, the members being arranged in a stack of alternating dielectric and electrically conductive members, and wherein each member comprises at least one gas pathway for the passage of the gas(es), such that when stacked the gas pathways are in communication with each other and the gas(es) are able to pass between an outer side of the stack and a chamber side of the stack, the members acting as a capacitive divider to reduce high voltages within the assembly.

2. A gas port assembly according to claim 1, wherein assembly is arranged such that the peak operating voltage is greater than about 2 kV.

3. A gas port assembly according to claim 1 or claim 2, wherein at least three dielectric members and at least two metallic members are provided.

4. A gas port assembly according to any of claims 1 to 3, wherein the gas pathways are arranged relative to one another such that the gas(es) follow a pre-defined path through the assembly.

5. A gas port assembly according to any of the preceding claims, wherein the dielectric members are arranged as discs, each having a number of ducts within them so as to provide the gas pathways, wherein for each disc, the ducts are positioned at locations which are

dissimilar to those within an adjacent disc within the stack.

6. A gas port assembly according to claim 5, wherein the diameter of each duct is about 2 mm or less.

7. A gas port assembly according to any of the preceding claims, wherein the width to height aspect ratio of the holes through the dielectric members lies in the range 0.2 to 1.0.

8. A gas port assembly according to any of the preceding claims, wherein the dielectric member(s) are formed from a ceramic or plastics material.

9. A gas port assembly according to claim 8, wherein the dielectric member(s) are formed from PTFE.

10. A gas port assembly according to any of the preceding claims, wherein the electrically conductive members are formed as gauzes or meshes.

11. A gas port assembly according to claim 9, wherein the metallic members are formed from a corrosion resistant alloy.

12. A gas port assembly according claim 10 or claim 11, wherein the gauzes or meshes are arranged to act as particle filters.

13. A gas port assembly according to any of the preceding claims, wherein the members are adapted to reduce discharges when the electrode(s) is operated at radio frequencies.

14. A gas port assembly according to claim 13, adapted for use with a frequency of about 13.56 MHz.

15. A gas port assembly according to any of the preceding claims, wherein the power supplied to the electrode(s) in use is in the range 20 to 5000 Watts.

16. A gas port assembly according to any of the preceding claims, adapted for use at a gas flow rate in the range 10 to 5000 sccm.

17. A gas port assembly according to any of the preceding claims, adapted for use with a gas pressure within the chamber in the range 5 to 10000 mTorr.

18. A gas port assembly according to any of the preceding claims wherein at least one surface of an end dielectric member within the stack comprises a recess for partially accommodating one of the electrically conductive members so as to reduce fringe electric fields.

19. A gas port assembly according to any of the preceding claims, further comprising one or each of:-

the said one or more electrodes to which the alternating electrical potential is supplied when in use; and,

an insulator for electrically insulating the members of the assembly from the electrode(s).

20. A gas port assembly according to claim 19 and when comprising an insulator, wherein the insulator and one or more of the dielectric members are formed as an integral unit.

21. A gas port assembly according to any of the preceding claims, wherein the assembly further comprises a coupling device such that the assembly can be removably coupled to the chamber.

22. A gas port assembly kit comprising a gas port assembly according to any of the preceding claims and one or more additional electrically conductive and/or dielectric members for selective use with the gas port assembly.

23. Plasma processing apparatus comprising:-

a chamber to which one or more gases are introduced when in use, the gas(es) being used to generate a plasma within the chamber;

at least one electrode to which an alternating electrical potential is applied in use so as to generate the plasma;

one or more gas port assemblies according to any of the preceding claims for supplying or removing gas(es) to or from the chamber; and

at least one insulator for electrically insulating the one or more gas port assemblies from the electrode(s).